

2.0 Summary of Existing Environmental Studies

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter “Q” designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues

- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Parcels 94Q and 146Q were identified as Category 1 CERFA sites. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) of hazardous substances or petroleum products has occurred on site property; however, because Parcels 94Q and 146Q were potentially formerly active as ranges, additional evaluation to determine the environmental condition of these parcels is required.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Parcels 94Q and 146Q. This section incorporates the components of the DQO process described in the publication EPA 600/R-96/005, *Guidance for the Data Quality Objectives Process* (EPA, 2000). The DQO process as applied to Parcels 94Q and 146Q is described in more detail in Section 3.4 of this SFSP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III methods where applicable, as presented in Chapter 4.0 in this SFSP and Section 5.0 of the QAP. Data will be reported in accordance with definitive data requirements of Chapter 2, *Chemistry Data Reporting Requirements and Data Package Deliverables*, USACE Engineer Manual 200-1-6, *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects* (USACE, 1997) and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data related to the SI at Parcels 94Q and 146Q, presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The users for the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and other USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

**Summary of Data Quality Objectives
Parcels 94Q and 146Q
Site Investigation
Fort McClellan, Calhoun County, Alabama**

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation other contractors, and possible future land users	None	<u>Contaminant Source</u> Parcels 94Q and 146Q (explosives and metals)	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs, TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	25 surface soil samples + QC
		<u>Migration Pathways</u> Rain runoff and erosion to surface soil, infiltration and leaching to subsurface soil and groundwater, biotransfer to venison, dust emissions and volatilization to ambient air.	<u>Subsurface Soil</u>		<u>Subsurface Soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs, TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	23 subsurface soil samples + QC
		<u>Potential Receptors</u> Residents (future), Recreational site user (current and future)	<u>Depositional Soil</u>	Definitive quality data for future decision- making	<u>Depositional Soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs, TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	6 depositional soil samples + QC
		<u>PSSC</u> metals, nitroexplosives, VOCs, SVOCs, herbicides, and pesticides	<u>Groundwater</u>		TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs, TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	4 groundwater samples + QC

ADEM - Alabama Department of Environmental Management.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
USACE - U.S. Army Corps of Engineers.
SI - Site investigation.
QC - Quality control.

TCL- Target compound list
TAL - Target analyte list.
PSSC - Potential site-specific chemical.
VOC - Volatile Organic Compounds.
SVOC - Semi-volatile Organic Compounds.
Cl- Chlorinated
OP- Organophosphorus

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes all receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates consistent and comprehensive evaluation of human health through graphically presenting all possible exposure pathways, including all sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium.

Primary contaminant release mechanisms were associated with training exercises (e.g., discharging bullets and ordnance to the ground), and possibly through leaks and spills. Potential contaminant transport pathways include rain runoff and erosion to surface soil, infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, and dust emissions and volatilization to ambient air.

Parcels 94Q and 146Q have been inactive since approximately 1974. Most of the land within the subject parcels is tree covered. Parcels 94Q and 146Q are located within the Choccolocco Corridor. The land in the Choccolocco Corridor is currently managed by the Alabama Forestry Commission for passive recreation. Recreational activities that may occur include hiking, biking, horseback riding, and hunting. Therefore, the most likely current receptor scenario for these sites is a recreational site user. Intermittent streams are present within and near the subject parcels. Because the site does not have surface water year round, there is not sufficient surface water to contain fish for consumption. Potential receptor scenarios considered, but not included under current land-use scenarios, are the:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.

- **Construction Worker.** The site is unused, and no development or construction is occurring.
- **Resident.** The site is not currently used for residential purposes.

Future land use at Parcels 94Q and 146Q will be managed by the Alabama Forestry Commission for passive recreation. Activities that may occur include hiking, biking, horseback riding, and hunting. Potential receptor scenarios evaluated for the future include the following:

- **Resident.** Although the site is not expected to be used for residential purposes, the resident is considered in order to provide information for the project manager and regulators.
- **Recreational Site User.** Because future land use is passive recreation, hunting, hiking, and mountain biking are viable options, the recreational site user is included. Fish ingestion will not be evaluated because the intermittent streams are too insufficient to support fish for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptor scenarios and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

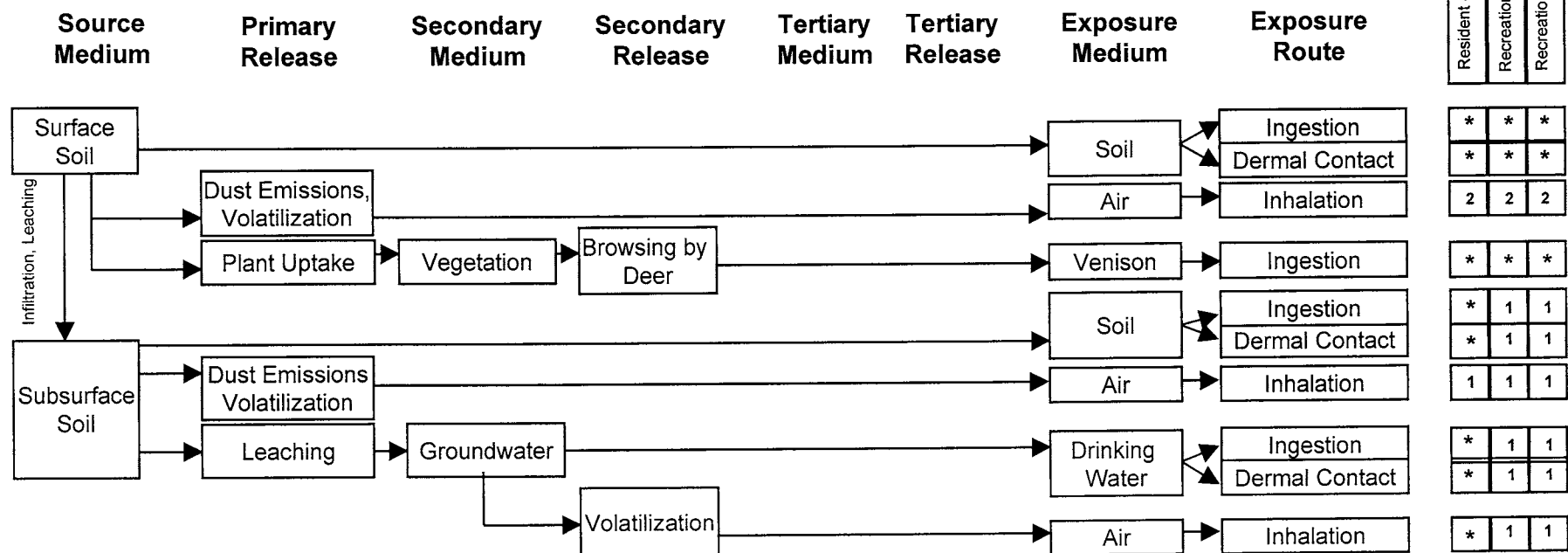
3.4 Decision-Making Process, Data Uses, and Needs

The seven-stage data quality objective decision-making process is presented in detail in Section 3.0 of the QAP and will be followed during the SI at Parcels 94Q and 146Q. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Parcels 94Q and 146Q will be based on using EPA definitive data to determine whether or not PSSCs are detected in site media. Detected site chemical concentrations will be compared to site-specific screening levels, ecological screening values, and background values to determine if PSSCs are present at the site at concentrations that pose an unacceptable risk to human health or the environment. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Figure 3-1
Human Health Conceptual Site Exposure Model
Parcels 94Q and 146Q
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.

1 = Incomplete exposure pathway.

2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods) will be addressed in accordance with the procedures in Section 5.3 of the WP (IT, 2002b).

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, and depositional soil will be sampled and analyzed to meet the objectives of the SI at Parcels 94Q and 146Q. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available, comply with EPA definitive data requirements, and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are defined in Section 3.3 and presented in Section 5.0 of the QAP (IT, 2002a).

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Parcels 94Q and 146Q are presumed or confirmed to be former ranges. Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance for sample collection activities at Parcels 94Q and 146Q. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2002a).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface metallic objects and shallow subsurface magnetic anomalies. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface magnetic anomalies will not be disturbed and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Appendix E of the SAP (IT, 2002a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling activities, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Appendix E of the SAP (IT, 2002a), will continue until undisturbed soil is encountered or the borehole has been advanced to 12 feet below ground surface, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2 of the SAP (IT, 2002a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at Parcels 94Q and 146Q includes the collection of surface soil, subsurface soil, groundwater, and depositional soil samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the environmental condition of the site and to determine any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from a total of 25 soil boring locations as follows:

- Parcel 94Q - surface soil samples will be collected from 12 locations
- Parcel 146Q - surface soil samples will be collected from 13 locations.

4.2.1.1 Sample Locations and Rationales

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2002a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a stainless-steel hand auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP (IT, 2002a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 6.8.3 of the SAP. Surface soil samples will be screened for information purposes only and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0 and listed in Table 4-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 6.0 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from a total of 23 soil boring locations as follows:

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
94Q	HR-94Q-GP01	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples located in the northwestern portion of the Parcel 94Q near several depressions that contained wooden debris. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP02	Surface soil	Surface soil sampling location to be placed in a target bunker located in the northwestern portion of Parcel 94Q. A surface soil sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP03	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the northwestern portion of Parcel 94Q in the western berm of three berms. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP04	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the northwestern portion of Parcel 94Q in the western berm of three berms. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP05	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the central berm of three berms located in Parcel 94Q. A surface and subsurface soil sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food or habitat purposes.
	HR-94Q-GP06	Surface soil	Surface soil sampling location to be placed in the central area of Parcel 94Q at the firing line side of a target mound. A surface soil sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP07	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the vicinity of several depressions and a swing-up target located in the central portion of Parcel 94Q. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
94Q (cont.)	HR-94Q-GP08	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the eastern berm of three berms located in Parcel 94Q. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP09	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed near a swing-up target located in the southeastern portion of Parcel 94Q. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-GP10	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the eastern portion of Parcel 94Q at the reported location of the firing range. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-94Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface and subsurface soil samples will be located in the northwestern portion of Parcel 94Q adjacent and downslope to several target bunkers. The soil sample data will be used to determine if previous site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.
	HR-94Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface and subsurface soil samples will be placed in the southeastern portion of Parcel 94Q downslope of a swing up target, a deep pit, and two large mounds. The soil sample data will be used to determine if previous site activities resulted in soil contamination. The soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
146Q	HR-146Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in a trench located in the southwestern area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred in this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed downslope of several depressions located in the northwestern area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in a berm located in the northwestern portion of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed downslope of a depression located in the northwestern area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near multiple pits and trenches observed in the southwestern area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in a trench located in the south-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

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Parcel Number	Sample Location	Sample Media	Sample Location Rationale
146Q (cont.)	HR-146Q-GP07	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in a trench located in the south-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP08	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in a trench located in the south-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP09	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near several depressions located in the north-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP10	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed downslope of a depression located in the north-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-GP11	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed downslope of several depressions, a large irregularly shaped hole, and a target pit located in the north-central area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the vicinity downslope of the multiple pits and trenches observed during the site walk in the southwestern area of Parcel 146Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

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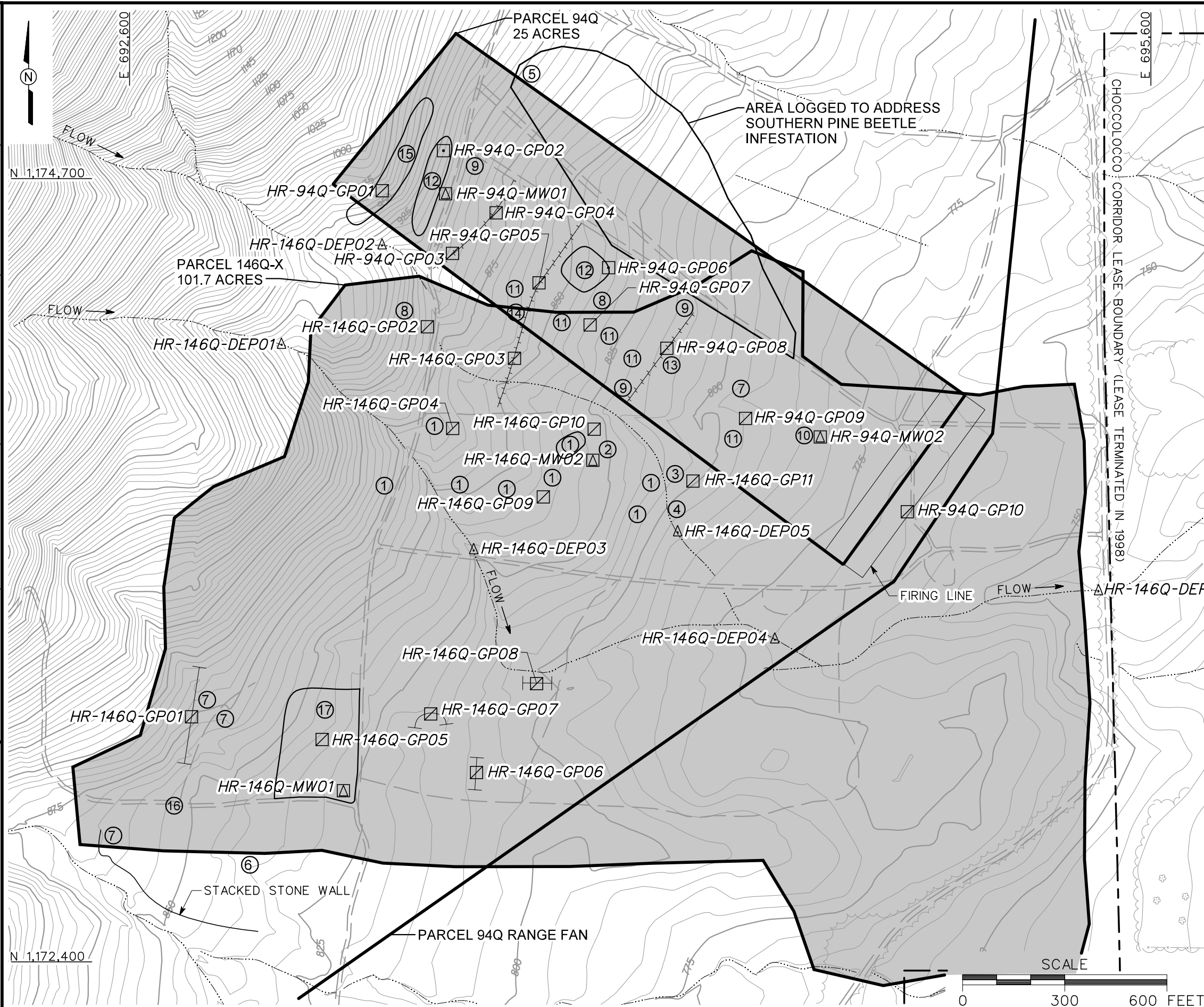
Parcel Number	Sample Location	Sample Media	Sample Location Rationale
146Q (cont.)	HR-146Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the north-central area of Parcel 146Q near several depressions. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.
	HR-146Q-DEP01	Depositional soil	This depositional soil sample location is west of Parcel 146Q in a southeasterly flowing surface water drainage feature. The drainage feature originates in the Choccolocco Mountains and conveys stormwater to the east/southeast. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-DEP02	Depositional soil	This depositional soil sample location is northwest of Parcel 146Q in a southeasterly flowing surface water drainage feature. The drainage feature originates in the Choccolocco Mountains and conveys stormwater to the east/southeast. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-DEP03	Depositional soil	This depositional soil sample location is in the central area of Parcel 146Q in a southeasterly flowing surface water drainage feature, downstream of several depressions that are presumed to be firing positions. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. Sample data will also be used to assess potential impacts to biota terrestrial in the waterway that might utilize the location for food and/or habitat purposes.
	HR-146Q-DEP04	Depositional soil	This depositional soil sample location is in the central area of Parcel 146Q in an east- southeasterly flowing surface water drainage feature, downstream of the confluence of two drainage features that convey most of the stormwater across Parcel 146Q. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

Table 4-1
Sampling Locations and Rationale
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

(Page 6 of 6)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
146Q	HR-146Q-DEP05	Depositional soil	This depositional soil sample location is in the central area of Parcel 146Q downstream of several depressions and a target pit. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-146Q-DEP06	Depositional soil	This depositional soil sample location is in an easterly flowing surface water drainage feature outside the eastern boundary of Parcel 146Q. A large portion of the stormwater conveyed from Parcel 146Q flows off-site through this drainage feature. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

DWG. NO.: ...\\796887es.321
INITIATOR: M. MALONEY
PROJ. MGR.: J. YACOBUB
DRAFT. CHK. BY:
ENGR. CHK. BY: S. MORAN
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 02/13/02
DRAWN BY: D. BOMAR
04/04/02
02:33:38
c:\cadd\design\796887es.321
bv on derg



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- FENCE
- TRENCH
- BERM
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED DEPOSITIONAL SOIL SAMPLE LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

- ① DEPRESSION
- ② ELECTRICITY SUPPLY
- ③ LARGE IRREGULAR SHAPED HOLE
- ④ TARGET PIT
- ⑤ DISMANTLED HELICOPTER
- ⑥ HALF DRUM, RUSTED
- ⑦ COILS OF RAZOR WIRE
- ⑧ MULTIPLE DEPRESSIONS
- ⑨ WOODEN SIGN, BROKEN DOWN
- ⑩ DEEP PIT AND TWO LARGE MOUNDS
- ⑪ SWING UP TARGET, ELECTRICAL CONDUIT RUNNING NW-SE
- ⑫ SEVERAL TARGET MOUNDS, ONE DEEP BUNKER, ELECTRICAL CONNECTIONS
- ⑬ POSSIBLE ELECTRIC CONNECTION FOR POP-UP TARGET CONTROL
- ⑭ STATIONARY TARGET
- ⑮ SHALLOW DEPRESSIONS WITH WOOD DEBRIS
- ⑯ MOUNTAIN BIKE TRAIL SIGN
- ⑰ MUTIPLE PITS AND TRENCHES

FIGURE 4-1
PROPOSED SAMPLE LOCATION
FORMER RANGE 40, PARCEL 94Q
AND RANGE, CHOCOLOCCO
CORRIDOR, PARCEL 146Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Table 4-2

Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

(Page 1 of 4)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-94Q-GP01	HR-94Q-GP01-SS-RJ0001-REG	0-1		HR-94Q-GP01-SS-RJ0001-MS/MSD	TAL Metals and Explosives
	HR-94Q-GP01-DS-RJ0002-REG	2-4			
HR-94Q-GP02	HR-94Q-GP02-SS-RJ0003-REG	0-1			TAL Metals and Explosives
HR-94Q-GP03	HR-94Q-GP03-SS-RJ0004-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP03-DS-RJ0005-REG	2-4			
HR-94Q-GP04	HR-94Q-GP04-SS-RJ0006-REG	0-1		HR-94Q-GP04-DS-RJ0008-FD	TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-94Q-GP04-DS-RJ0007-REG	2-4			
HR-94Q-GP05	HR-94Q-GP05-SS-RJ0009-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP05-DS-RJ0010-REG	2-4			
HR-94Q-GP06	HR-94Q-GP06-SS-RJ0011-REG	0-1			TAL Metals and Explosives
HR-94Q-GP07	HR-94Q-GP07-SS-RJ0012-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP07-DS-RJ0013-REG	2-4			
HR-94Q-GP08	HR-94Q-GP08-SS-RJ0014-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP08-DS-RJ0015-REG	2-4			
HR-94Q-GP09	HR-94Q-GP09-SS-RJ0016-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP09-DS-RJ0017-REG	2-4			

Table 4-2

Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

(Page 2 of 4)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-94Q-GP10	HR-94Q-GP10-SS-RJ0018-REG	0-1			TAL Metals and Explosives
	HR-94Q-GP10-DS-RJ0019-REG	2-4			
HR-94Q-MW01	HR-94Q-MW01-SS-RJ0020-REG	0-1	HR-94Q-MW01-SS-RJ0021-FD		TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-94Q-MW01-DS-RJ0022-REG	2-4			
HR-94Q-MW02	HR-94Q-MW02-SS-RJ0023-REG	0-1			TAL Metals and Explosives
	HR-94Q-MW02-DS-RJ0024-EG	2-4			
HR-146Q-GP01	HR-146Q-GP01-SS-RK0001-REG	0-1		HR-146Q-GP01-SS-RK0001-MS/MSD	TAL Metals and Explosives
	HR-146Q-GP01-DS-RK0002-REG	2-4			
HR-146Q-GP02	HR-146Q-GP02-SS-RK0003-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP02-DS-RK0004-REG	2-4			
HR-146Q-GP03	HR-146Q-GP03-SS-RK0005-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP03-DS-RK0006-REG	2-4			
HR-146Q-GP04	HR-146Q-GP04-SS-RK0007-REG	0-1			TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-146Q-GP04-DS-RK0008-REG	2-4	HR-146Q-GP04-DS-RK0009-FD		
HR-146Q-GP05	HR-146Q-GP05-SS-RK0010-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP05-DS-RK0011-REG	2-4			
HR-146Q-GP06	HR-146Q-GP06-SS-RK0012-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP06-DS-RK0013-REG	2-4			

Table 4-2

Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama

(Page 3 of 4)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-146Q-GP07	HR-146Q-GP07-SS-RK0014-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP07-DS-RK0015-REG	2-4			
HR-146Q-GP08	HR-146Q-GP08-SS-RK0016-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP08-DS-RK0017-REG	2-4			
HR-146Q-GP09	HR-146Q-GP09-SS-RK0018-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP09-DS-RK0019-REG	2-4			
HR-146Q-GP10	HR-146Q-GP10-SS-RK0020-REG	0-1			TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-146Q-GP10-DS-RK0021-REG	2-4	HR-146Q-GP10-DS-RK0022-FD		
HR-146Q-GP11	HR-146Q-GP11-SS-RK0023-REG	0-1			TAL Metals and Explosives
	HR-146Q-GP11-DS-RK0024-REG	2-4			
HR-146Q-MW01	HR-146Q-MW01-SS-RK0025-REG	0-1			TAL Metals and Explosives
	HR-146Q-MW01-DS-RK0026-REG	2-4			
HR-146Q-MW02	HR-146Q-MW02-SS-RK0027-REG	0-1			TAL Metals and Explosives
	HR-146Q-MW02-DS-RK0028-REG	2-4			
HR-146Q-DEP01	HR-146Q-DEP01-DEP-RK0029-REG	0-1			TAL Metals and Explosives
HR-146Q-DEP02	HR-146Q-DEP02-DEP-RK0030-REG	0-1	HR-146Q-DEP02-DEP-RK0031-FD		TAL Metals and Explosives
HR-146Q-DEP03	HR-146Q-DEP03-DEP-RK0032-REG	0-1			TAL Metals and Explosives

Table 4-2

**Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 4)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-146Q-DEP04	HR-146Q-DEP04-DEP-RK0033-REG	0-1			TAL Metals and Explosives
HR-146Q-DEP05	HR-146Q-DEP05-DEP-RK0034-REG	0-1			TAL Metals and Explosives
HR-146Q-DEP06	HR-146Q-DEP06-DEP-RK0035-REG	0-1			TAL Metals and Explosives

CI - Chlorinated.

OP - Organophosphorus.

Explosives - Nitroaromatic and Nitramine explosives.

FD - Field duplicate.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

- Parcel 94Q - subsurface soil samples will be collected from 10 locations
- Parcel 146Q - subsurface soil samples will be collected from 13 locations.

4.2.2.1 Sample Locations and Rationales

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The sampling rationale for each subsurface soil sample location is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility and UXO clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2002a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a hand auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP (IT, 2002a).

Soil samples will be collected continuously for the first 4 feet or until either groundwater or refusal is reached. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 6.8.3 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicates a reading exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples will be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. The depth of the boring may be extended beyond 4 feet below ground surface, and more than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP.

Sample containers, sample volumes, preservatives, and holding times for the analyses required in

this SFSP are discussed in Section 4.0 and listed in Table 4-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

A total of four permanent residuum monitoring wells, consisting of two wells at Parcel 94Q and two wells at Parcel 146Q, will be installed. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for each monitoring well location is presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long.

At the discretion of the IT site manager, a sump (composed of new, 2-inch inside-diameter, Schedule 40, threaded, flush-joint PVC) may be attached to the bottom of the well screen. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. In wells installed to depths of 20 feet or less, the filter pack material will be gravity filled. In wells installed to depths greater than 20 feet, the filter pack will be tremied into place. The filter pack will be installed from the bottom of the well to approximately five feet above the top of the well screen. The filter pack will consist of 20/40 silica sand. A fine sand (30/70 silica sand), approximately five feet thick, may be placed above the filter pack. A bentonite seal, approximately five feet thick, will be placed above the filter pack (or fine sand, if used). The remaining annular space will be grouted with a bentonite-cement mixture, using approximately 7 to 8 gallons of water and approximately 5 pounds of bentonite per 94-pound bag of Type I or Type II Portland cement. The grout will be tremied into place from the top of the bentonite seal to ground surface. Monitoring wells will be completed with stick-up or flush mount construction as determined by the site geologist based on site conditions.

Soil samples for lithology will be collected starting at 5 feet below ground surface and at 5-foot intervals to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID for potential volatile organic compounds. The monitoring wells will be drilled, installed, and developed as specified in

Section 5.1 and Appendix C of the SAP (IT, 2002a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the four monitoring wells completed at Parcels 94Q and 146Q, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationales

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water level will be measured at each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 5.5 of the SAP (IT, 2002a). Groundwater samples will be collected in accordance with the procedures outlined in Section 6.1.1.5 and Attachment 5 of the SAP. Low-flow groundwater sampling methodology outlined in Attachment 5, Procedure No. FTMC-GW-001 of the SAP (IT, 2002a) may be used as deemed necessary by the IT site manager.

Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP.

Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0 and listed in Table 4-1 of the QAP (IT, 2002a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Depositional Soil Sampling

Six depositional soil samples will be collected within and in the vicinity of Parcel 146Q.

4.2.5.1 Sample Locations and Rationales

The proposed locations for the depositional soil samples are shown in Figure 4-1. Depositional soil sampling rationale is presented in Table 4-1. The depositional soil sample designations and QA/QC sample requirements are listed in Table 4-2. The actual depositional soil sample points will be at the discretion of the ecological sampler, based upon the surface water drainage pathways and actual field observations.

Table 4-3

**Groundwater Sample Designation and Analytical Parameters
Site Investigation, Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix ^a	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-94Q-MW01	HR-94Q-MW01-GW-RJ3001-REG	Groundwater	HR-94Q-MW01-GW-RJ3002-FD		TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
HR-94Q-MW02	HR-94Q-MW02-GW-RJ3003-REG	Groundwater			TAL Metals, Explosives
HR-146Q-MW01	HR-146Q-MW01-GW-RK3001-REG	Groundwater		HR-146Q-MW01-GW-RK3001-MS/MSD	TAL Metals, Explosives
HR-146Q-MW02	HR-146Q-MW02-GW-RK3002-REG	Groundwater			TAL Metals, Explosives

CI - Chlorinated.

Explosives - Nitroaromatic and Nitramine explosives.

FD - Field duplicate.

MS/MSD - Matrix spike/matrix spike duplicate.

OP - Organophosphorus.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

^a Groundwater samples will be collected from the approximate top 5 to 10 feet of the water column per Attachment 5 of the Installation-Wide Sampling and Analysis Plan (IT, 2002a).

4.2.5.2 Sample Collection

The depositional soil samples will be collected in accordance with the procedures for surface soil samples specified in Section 6.1.1.1 of the SAP. Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required are discussed in Section 4.0 and listed in Table 4-1 of the QAP. The depositional samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and non-sampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.1 of the SAP (IT, 2002a). Decontamination of non-sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.2 of the SAP.

4.4 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil sample locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of survey accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.4.1.1 of the SAP. Conventional land survey requirements are presented in Section 4.4.1.2 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter will be analyzed for specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and

USACE requirements. Target analyses for samples collected from Parcels 94Q and 146Q consist of the following list of analytical suites:

- Target analyte list metals - Method 6010B/7000
- Nitroaromatic/nitramine explosives - Method 8330.

Approximately ten percent of the sample types will be analyzed for the following list of analytical suites:

- Target compound list volatile organic compounds – Method 5035/8260B
- Target compound list semivolatile organic compounds – Method 8270C
- Chlorinated pesticides - Method 8081A
- Chlorinated herbicides - Method 8151A
- Organophosphorous pesticides - Method 8141A.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Section 5.0 in the QAP. Data will be reported in accordance with definitive data requirements of Chapter 2 of the USACE Engineer Manual 200-1-6, *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects* (USACE, 1997), and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Sections 6.1.3 through 6.1.7 of the SAP (IT, 2002a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Sample Receiving/Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889.

Table 4-4

**Analytical Samples
Site Investigation, Parcels 94Q and 146Q
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a				EMAX Total No. Analysis
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	

Parcels 94Q and 146Q-X: 4 water matrix samples (4 groundwater samples) and 54 soil matrix samples (25 surface, 23 subsurface, and 6 depositional soil samples)

All samples will be analyzed for the following parameters:

Explosives	8330	water	normal	4	1	4	1	1	0	1	8
TAL Metals	6010B/7000	water	normal	4	1	4	1	1	0	1	8
Explosives	8330	soil	normal	54	1	54	5	2	0	1	64
TAL Metals	6010B/7000	soil	normal	54	1	54	5	2	0	1	64

Approximately 10% of the samples will be analyzed for the following parameters:

TCL VOCs	8260B	water	normal	1	1	1	1	0	2	1	5
TCL SVOCs	8270C	water	normal	1	1	1	1	0	0	1	3
Chlorinated Pesticides	8081A	water	normal	1	1	1	1	0	0	1	3
Organophosphorus Pesticides	8141A	water	normal	1	1	1	1	0	0	1	3
Chlorinated Herbicides	8151A	water	normal	1	1	1	1	0	0	1	3
TCL VOCs	8260B	soil	normal	8	1	8	4	0	0	1	13
TCL SVOCs	8270C	soil	normal	8	1	8	4	0	0	1	13
Chlorinated Pesticides	8081A	soil	normal	8	1	8	4	0	0	1	13
Organophosphorus Pesticides	8141A	soil	normal	8	1	8	4	0	0	1	13
Chlorinated Herbicides	8151A	soil	normal	8	1	8	4	0	0	1	13

Parcel 97Q, 144Q-X and 147Q-X Subtotal: 161 37 6 2 14 226

^aField duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.

Trip blank samples will be collected with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

MS/MSD - Matrix spike/matrix spike duplicate.

Explosives - Nitroaromatic and Nitramine.

QA/QC - Quality assurance/quality control.

SVOCs - Semivolatile organic compounds.

TAL - Target analyte list.

TAT - Turn-around time

TCL - Target compound list.

VOCs - Volatile organic compounds.

Ship samples to: EMAX Laboratories, Inc.
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements described in Appendix D of the SAP (IT, 2002a). The IDW expected to be generated at Parcels 94Q and 146Q will include decontamination fluids, drill cuttings, purge water, and disposable personal protective equipment. Sampling of IDW to obtain analytical results for characterizing the waste for disposal will follow the procedures specified in Section 6.1.1.8 of the SAP (IT, 2002a).

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Parcels 94Q and 146Q. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan, Appendix A of the SAP (IT, 2002a).

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team.

6.0 References

- Environmental Science and Engineering, Inc. (ESE), 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.
- IT Corporation (IT), 2002a, *Draft Revision 3, Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, February.
- IT Corporation (IT), 2002b, *Draft Revision 2, Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, February.
- U.S. Army Corps of Engineers (USACE), 1999a, *Archives Search Report, Conclusions and Recommendations, Fort McClellan, Anniston, Alabama*, July.
- U.S. Army Corps of Engineers (USACE), 1999b, *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama*, July.
- U.S. Army Corps of Engineers (USACE), 1999c, *Statement of Work for Task Order CK10, Remedial Investigations(RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama*, June.
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- U.S. Department of Agriculture (USDA), 1961, *Soil Survey, Calhoun County, Alabama*, Soil Conservation Service, Series 1958, No. 9, September.
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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALAD	-aminolevulinic acid dehydratase
amb.	Amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AWARE	Associated Water and Air Resources Engineers, Inc.
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor; bioconcentration factor

BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CAB	chemical warfare agent breakdown products
CAMU	corrective action management unit
CBR	chemical, biological and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	carbonyl chloride (phosgene)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity

Cl.	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical(s) of potential concern
COPEC	chemical(s) of potential ecological concern
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
‘D’	duplicate; dilution
D&I	detection and identification
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate

List of Abbreviations and Acronyms (Continued)

DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC ₅₀	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical/Biological Command
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank

FD	field duplicate
FDA	U.S. Food and Drug Administration
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
FMP 1300	Former Motor Pool 1300
FOMRA	Former Ordnance Motor Repair Area
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m ³	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain

GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
HPLC	high performance liquid chromatography
HNO ₃	nitric acid
HQ	hazard quotient
HQ _{screen}	screening-level hazard quotient
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
‘I’	out of control, data rejected due to low recovery
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System™

List of Abbreviations and Acronyms *(Continued)*

‘J’	estimated concentration	MMBtu/hr	million Btu per hour	NRCC	National Research Council of Canada
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	MOGAS	motor vehicle gasoline	NRHP	National Register of Historic Places
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	MP	Military Police	ns	nanosecond
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	MPA	methyl phosphonic acid	N-S	north to south
JPA	Joint Powers Authority	MPM	most probable munition	NS	not surveyed
K	conductivity	MQL	method quantitation limit	NSA	New South Associates, Inc.
K _{ow}	octonal-water partition coefficient	MR	molasses residue	nT	nanotesla
L	lewisite; liter	MRL	method reporting limit	nT/m	nanoteslas per meter
l	liter	MS	matrix spike	NTU	nephelometric turbidity unit
LBP	lead-based paint	mS/cm	millisiemens per centimeter	nv	not validated
LC	liquid chromatography	mS/m	millisiemens per meter	O ₂	oxygen
LCS	laboratory control sample	MSD	matrix spike duplicate	O&G	oil and grease
LC ₅₀	lethal concentration for 50 percent population tested	MTBE	methyl tertiary butyl ether	O&M	operation and maintenance
LD ₅₀	lethal dose for 50 percent population tested	msl	mean sea level	OB/OD	open burning/open detonation
LEL	lower explosive limit	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded	OD	outside diameter
LOAEL	lowest-observed-advserse-effects-level	mV	millivolts	OE	ordnance and explosives
LT	less than the certified reporting limit	MW	monitoring well	oh	organic clays of medium to high plasticity
LUC	land-use control	MWI&P	Monitoring Well Installation and Management Plan	ol	organic silts and organic silty clays of low plasticity
LUCAP	land-use control assurance plan	Na	sodium	OP	organophosphorus
LUCIP	land-use control implementation plan	NA	not applicable; not available	ORP	oxidation-reduction potential
max	maximum	NAD	North American Datum	OSHA	Occupational Safety and Health Administration
MB	method blank	NAD83	North American Datum of 1983	OSWER	Office of Solid Waste and Emergency Response
MCL	maximum contaminant level	NAVD88	North American Vertical Datum of 1988	OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
MCLG	maximum contaminant level goal	NAS	National Academy of Sciences	OVS	oil/water separator
MCPA	4-chloro-2-methylphenoxyacetic acid	NCEA	National Center for Environmental Assessment	oz	ounce
MCS	media cleanup standard	NCP	National Contingency Plan	PA	preliminary assessment
MD	matrix duplicate	NCRP	National Council on Radiation Protection and Measurements	PAH	polynuclear aromatic hydrocarbon
MDC	maximum detected concentration	ND	not detected	PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
MDCC	maximum detected constituent concentration	NE	no evidence; northeast	Parsons	Parsons Engineering Science, Inc.
MDL	method detection limit	ne	not evaluated	Pb	lead
mg	milligrams	NEW	net explosive weight	PBMS	performance-based measurement system
mg/kg	milligrams per kilogram	NFA	No Further Action	PC	permeability coefficient
mg/kg/day	milligram per kilogram per day	NG	National Guard	PCB	polychlorinated biphenyl
mg/kgbw/day	milligrams per kilogram of body weight per day	NGP	National Guardsperson	PCDD	polychlorinated dibenzo-p-dioxins
mg/L	milligrams per liter	ng/L	nanograms per liter	PCDF	polychlorinated dibenzofurans
mg/m ³	milligrams per cubic meter	NGVD	National Geodetic Vertical Datum	PCE	perchloroethene
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	Ni	nickel	PCP	pentachlorophenol
MHz	megahertz	NIC	notice of intended change	PDS	Personnel Decontamination Station
µg/g	micrograms per gram	NIOSH	National Institute for Occupational Safety and Health	PEF	particulate emission factor
µg/kg	micrograms per kilogram	NIST	National Institute of Standards and Technology	PEL	permissible exposure limit
µg/L	micrograms per liter	NLM	National Library of Medicine	PES	potential explosive site
µmhos/cm	micromhos per centimeter	NPDES	National Pollutant Discharge Elimination System	Pest.	pesticides
min	minimum	NPW	net present worth	PETN	pentarey thritol tetranitrate
MINICAMS	miniature continuous air monitoring system	No.	number	PFT	portable flamethrower
ml	inorganic silts and very fine sands	NOAA	National Oceanic and Atmospheric Administration	PG	professional geologist
mL	milliliter	NOAEL	no-observed-adverse-effects-level	PID	photoionization detector
mm	millimeter	NR	not requested; not recorded; no risk	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
MM	mounded material	NRC	National Research Council		

List of Abbreviations and Acronyms (Continued)

PM	project manager	RTECS	Registry of Toxic Effects of Chemical Substances	STEL	short-term exposure limit
POC	point of contact	RTK	real-time kinematic	STL	Severn-Trent Laboratories
POL	petroleum, oils, and lubricants	SA	exposed skin surface area	STOLS	Surface Towed Ordnance Locator System®
POW	prisoner of war	SAD	South Atlantic Division	Std. units	standard units
PP	peristaltic pump; Proposed Plan	SAE	Society of Automotive Engineers	SU	standard unit
ppb	parts per billion	SAIC	Science Applications International Corporation	SUXOS	senior UXO supervisor
PPE	personal protective equipment	SAP	installation-wide sampling and analysis plan	SVOC	semivolatile organic compound
ppm	parts per million	sc	clayey sands; sand-clay mixtures	SW	surface water
PPMP	Print Plant Motor Pool	Sch.	Schedule	SW-846	U.S. EPA’s <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>
ppt	parts per thousand	SCM	site conceptual model	SWMU	solid waste management unit
PR	potential risk	SD	sediment	SWPP	storm water pollution prevention plan
PRA	preliminary risk assessment	SDG	sample delivery group	SZ	support zone
PRG	preliminary remediation goal	SDZ	safe distance zone; surface danger zone	TAL	target analyte list
PSSC	potential site-specific chemical	SEMS	Southern Environmental Management & Specialties, Inc.	TAT	turn around time
pt	peat or other highly organic silts	SF	cancer slope factor	TB	trip blank
PVC	polyvinyl chloride	SFSP	site-specific field sampling plan	TBC	to be considered
QA	quality assurance	SGF	standard grade fuels	TCA	trichloroethane
QA/QC	quality assurance/quality control	SHP	installation-wide safety and health plan	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
QAM	quality assurance manual	SI	site investigation	TCDF	tetrachlorodibenzofurans
QAO	quality assurance officer	SINA	Special Interest Natural Area	TCE	trichloroethene
QAP	installation-wide quality assurance plan	SL	standing liquid	TCL	target compound list
QC	quality control	SLERA	screening-level ecological risk assessment	TCLP	toxicity characteristic leaching procedure
QST	QST Environmental, Inc.	sm	silty sands; sand-silt mixtures	TDEC	Tennessee Department of Environment and Conservation
qty	quantity	SM	Serratia marcescens	TDGCL	thiodiglycol
Qual	qualifier	SMDP	Scientific Management Decision Point	TDGCLA	thiodiglycol chloroacetic acid
‘R’	rejected data; resample	s/n	signal-to-noise ratio	TERC	Total Environmental Restoration Contract
R&A	relevant and appropriate	SOP	standard operating procedure	THI	target hazard index
RA	remedial action	SOPQAM	U.S. EPA’s <i>Standard Operating Procedure/Quality Assurance Manual</i>	TIC	tentatively identified compound
RAO	removal action objective	sp	poorly graded sands; gravelly sands	TLV	threshold limit value
RBC	risk-based concentration	SP	submersible pump	TN	Tennessee
RCRA	Resource Conservation and Recovery Act	SPCC	system performance calibration compound	TNT	trinitrotoluene
RD	remedial design	SPCS	State Plane Coordinate System	TOC	top of casing; total organic carbon
RDX	cyclonite	SPM	sample planning module	TPH	total petroleum hydrocarbons
ReB3	Rarden silty clay loams	SQRT	screening quick reference tables	TR	target cancer risk
REG	regular field sample	Sr-90	strontium-90	TRADOC	U.S. Army Training and Doctrine Command
REL	recommended exposure limit	SRA	streamlined human health risk assessment	TRPH	total recoverable petroleum hydrocarbons
RFA	request for analysis	SRM	standard reference material	TSCA	Toxic Substances Control Act
RfC	reference concentration	Ss	stony rough land, sandstone series	TSDF	treatment, storage, and disposal facility
RfD	reference dose	SS	surface soil	TWA	time-weighted average
RGO	remedial goal option	SSC	site-specific chemical	UCL	upper confidence limit
RI	remedial investigation	SSHO	site safety and health officer	UCR	upper certified range
RL	reporting limit	SSHP	site-specific safety and health plan	‘U’	not detected above reporting limit
RME	reasonable maximum exposure	SSL	soil screening level	UF	uncertainty factor
ROD	Record of Decision	SSSL	site-specific screening level	USACE	U.S. Army Corps of Engineers
RPD	relative percent difference	SSSSL	site-specific soil screening level	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
RRF	relative response factor	STB	supertropical bleach	USAEC	U.S. Army Environmental Center
RSD	relative standard deviation	STC	source-term concentration	USAEHA	U.S. Army Environmental Hygiene Agency
RTC	Recruiting Training Center	STD	standard deviation	USACMLS	U.S. Army Chemical School

List of Abbreviations and Acronyms (Continued)

USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women’s Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd ³	cubic yards

- S – Non-target compound analyzed for and detected (GC/MS methods)
- T – Non-target compound analyzed for but not detected (non GC/MS methods)
- U – Analysis in unconfirmed
- Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

- J – The low-spike recovery is low
- N – The high-spike recovery is low
- R – Data is rejected

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

- LT – Less than the certified reporting limit

Flagging Codes

- 9 – Non-demonstrated/validated method performed for USAEC
- B – Analyte found in the method blank or QC blank
- C – Analysis was confirmed
- D – Duplicate analysis
- I – Interfaces in sample make quantitation and/or identification to be suspicious
- J – Value is estimated
- K – Reported results are affected by interfaces or high background
- N – Tentatively identified compound (match greater than 70%)
- Q – Sample interference obscured peak of interest
- R – Non-target compound analyzed for but not detected (GC/MS methods)